

GP-303570

## CLAIMS

What is Claimed is:

1. A membrane electrode assembly (MEA) comprising:
  - an anode side including an anode diffusion media layer, an anode catalyst layer and an anode ionomer layer, said anode catalyst layer being deposited on the anode diffusion media layer and said anode ionomer layer being sprayed on the anode catalyst layer;
  - a cathode side including a cathode diffusion media layer, a cathode catalyst layer and a cathode ionomer layer, said cathode catalyst layer being deposited on the cathode diffusion media layer and said cathode ionomer layer being sprayed on the cathode catalyst layer; and
  - a membrane positioned between the anode side and the cathode side, wherein the anode ionomer layer and the cathode ionomer layer face the membrane.
2. The MEA according to claim 1 wherein the anode side further includes an anode microporous layer positioned between the anode diffusion media layer and the anode catalyst layer, and wherein the cathode side further includes a cathode microporous layer positioned between the cathode diffusion media layer and the cathode catalyst layer.
3. The MEA according to claim 2 wherein the anode microporous layer and the cathode microporous layer are made of a carbon and Teflon mixture.
4. The MEA according to claim 1 wherein the anode catalyst layer is about the same size in area as the anode diffusion media layer and the cathode catalyst layer is about the same size in area as the cathode diffusion media layer.
5. The MEA according to claim 1 wherein the ionomer layers include methanol.

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6. The MEA according to claim 1 wherein the membrane is a perfluorinated membrane.

7. The MEA according to claim 1 wherein the MEA is used in a proton exchange membrane fuel cell.

8. An electrode comprising a diffusion media layer, a catalyst layer, and an ionomer layer, said catalyst layer being deposited on the diffusion media layer and said ionomer layer being sprayed on the catalyst layer, said electrode further comprising a membrane positioned adjacent to the ionomer layer.

9. The electrode according to claim 8 wherein the catalyst layer is about the same size as the diffusion media layer.

10. The electrode according to claim 8 further comprising a microporous layer positioned between the diffusion media layer and the catalyst layer.

11. The electrode according to claim 10 wherein the microporous layer is made of a carbon and Teflon mixture.

12. The electrode according to claim 8 wherein the membrane is a perfluorinated membrane.

13. The electrode according to claim 8 wherein the ionomer layer includes methanol.

14. The electrode according to claim 8 wherein the electrode is part of a membrane electrode assembly for a fuel cell.

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15. A method of making a membrane electrode assembly (MEA), said method comprising:

- providing a diffusion media layer;
- depositing a catalyst layer on the diffusion media layer;
- spraying an ionomer layer on the catalyst layer; and
- positioning the diffusion media layer adjacent to a membrane so that the ionomer layer faces the membrane.

16. The method according to claim 15 wherein depositing a catalyst layer on the diffusion media layer includes depositing the catalyst layer so that it is about the same size as the diffusion media layer.

17. The method according to claim 15 further comprising providing a microporous layer as part of the diffusion media layer, where the catalyst layer is deposited on the microporous layer.

18. The method according to claim 15 wherein the membrane is a perfluorinated membrane.

19. The method according to claim 15 further comprising annealing the MEA at 130°C-160°C.